atmospheric electricity

one 2 Next >

NNN
Anti-Tenturian

hmm... here I came across such a scheme:

Иллюстрация листовки описания "Устройства для получения энергии из электрического поля атмосферы" Патент RU 2245606

maybe it will be useful for someone for experiments...

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here is a small excerpt from the "theoretical" description:

===

Does the Earth have its own electric field? Who remembers its characteristics?

For absolutely clear weather, near the equator, the vertical electric field strength at the sea surface is ~ 130 volts per meter. That is, by raising your hands above your head, you will get between your fingers and boots, a voltage difference equal to the amplitude voltage in a conventional outlet, about 310 volts. Why doesn't anyone notice this? Firstly, the body is a conducting object and its potential almost coincides with the ground potential. Secondly, air is an excellent insulator and electric current flows through it at much higher intensities. About 30 kilovolts / cm, yeah ... And even in this case, the current through the air is indecently small, milliamps and fractions of a milliamp. Anyone who has been in the mountains and seen how the “fires of St. Elmo” appear on the fingers and points, in bad weather, is familiar with the extreme version of atmospheric electricity. And personally, such lights were shown to me at school, with the help of an electric car. You are standing on a dielectric stool, in a darkened classroom, someone is turning the handle of the unit, and you have your hair sticking up in all directions and blue corona discharges are burning on your outstretched arms. M-dya ... And if, on the same "electric stool" to put a girl with long hair - a spectacle outrageous. The field spreads her hair in a "sheaf" in all directions, each hair separately ... Screeching, screaming, sparks ... to put a girl with long hair is a sight to behold. The field spreads her hair in a "sheaf" in all directions, each hair separately ... Screeching, screaming, sparks ... to put a girl with long hair is a sight to behold. The field spreads her hair in a "sheaf" in all directions, each hair separately ... Screeching, screaming, sparks ...

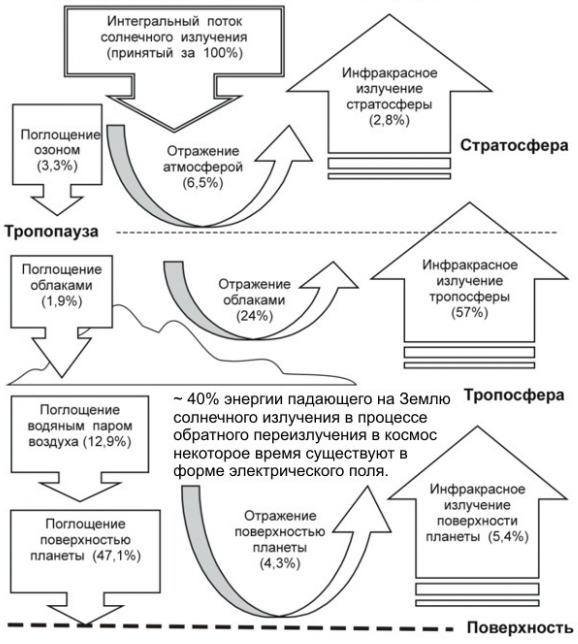
The same effect can be obtained with very simple, almost home remedies. It is enough to have a high lightning rod at hand or launch a balloon or a kite into the sky, on a metal wire. The simplest arithmetic. If with each meter the voltage increases by 100-200 volts, then already a few tens of meters above the ground conditions arise for the breakdown of air by an electric discharge.

It can be calculated specifically. Do you know the lightning rod formula? Come on! Okay

... I understand that you would never need it in your life, therefore you didn't fill your head with nonsense ... Who knew that fortune would turn its back? Well, I remind you - "The lightning rod protects the site from atmospheric discharge (lightning), in the form of a circle circumscribed around its base, with a radius equal to its height." Why? Because the lightning rod is a voltage concentrator, and all the force lines of the atmospheric electric field, which were previously evenly distributed over this site, are now "pulled" to its top. There, on occasion, lightning will strike from a thundercloud. Towards the "leader" developing from the top of the lightning rod. I mean, first, a corona discharge will appear above its elevated part, and from there it will pull a chain of air ions, sufficient to break through lightning of the "linear" type. God, guys, why do you have such gloomy faces?

The question is, is it possible to obtain a similar effect (a gas discharge on a highly raised electrode) in clear, cloudless weather? And if so, what does it give us in a practical sense? After all, outside the discharge, the air will remain a dielectric. Then why? There is a reason and meaning, however... Where does the electric charge of the atmosphere come from? What feeds and sustains it, um... billions of years?

СРЕДНЕГОДОВОЙ РАДИАЦИОННЫЙ БАЛАНС ПЛАНЕТЫ ЗЕМЛЯ



СРЕДНЯЯ ПЛОТНОСТЬ ПОТОКА ТЕПЛОВОЙ ЭНЕРГИИ СОЛНЦА НА ПОВЕРХНОСТИ СЕВЕРНОГО ПОЛУШАРИЯ (Вт/м^2)

Месяц	Широта местности, град									
	0	10	20	30	40	50	60	70	80	90
Январь	242	200	154	104	54	21	-----	-----	-----	-----
Февраль	255	221	179	133	83	42	8	-----	-----	-----
Март	266	250	221	183	141	91	46	**13**	-----	-----
Апрель	263	263	255	234	204	162	117	**71**	**24**	**5**
Май	245	263	271	266	255	229	192	150	120	**96**
Июнь	229	258	275	284	279	266	245	216	196	196
Июль	225	255	275	284	284	263	250	221	208	203
Август	237	258	263	271	258	241	208	167	133	125
Сентябрь	255	263	258	242	213	179	133	**88**	**42**	**16**
Октябрь	263	250	229	196	154	109	63	**21**	-----	-----
Ноябрь	255	225	188	146	96	50	16	-----	-----	-----
Декабрь	242	204	157	109	63	21	-----	-----	-----	-----
Среднее за год	248	242	227	204	162	138	106	**79**	**60**	**53**
Допустимо использовать	**3,7**	3,6	3,4	3,1	2,4	2,1	1,6	1,2	0,9	0,8

По опыту эксплуатации солнечных электростанций разных типов, совершенно безопасная норма использования - 1,5% от среднего потока энергии.

Approximately 40% of the energy of the sunlight falling on the Earth, in the course of the return radiation into space, for some time (the section of convective heat exchange) is converted into the energy of a potential electric field. The charge of the tropopause and the stratosphere is produced by flows of heated air with an admixture of water vapor ascending from the surface of the planet. The natural leakage of this charge is carried out due to the ionization of air by cosmic rays, thunderstorms, rain and snow falling on mountain peaks. Have you ever wondered why high peaks are always covered with snow caps? There, the same electric field, day and night, pulls the charged ice dust hanging in the upper layers of the atmosphere.

However, let's start from afar, from space. The temperature of any celestial body is rigidly

set by the integral power of external radiation absorbed by its surface and internal heat release from the depths. For the Earth, the average annual flux of sunlight ranges from 250-300 W/sq. meter at the equator up to 50-120 W/sq. meter in the polar regions. Cooling in a vacuum, of course, is purely radiative.

The sum of the energy fluxes reaching the surface is exactly equal to the energy flux radiated back into space. But, many planets of the solar system (in particular the Earth) have an atmosphere. They have only the stratosphere (from where thermal radiation goes into the world space) is close to the norm of the thermal balance (for the Earth, about -25 degrees C). On the surface of a celestial body surrounded by a gaseous shell, it is always much warmer. This thing is called the "greenhouse effect".

Any atmosphere is a spectral filter with multiple transparency windows. It can transmit light of a strictly defined range. Since the maximum of the return (thermal) radiation from the surface is always shifted, relative to the absorbed, to the long-wave region, then radiative cooling (like naked asteroids) is also impossible. Radiation from the surface does not diverge, heating the surrounding air. To remove thermal energy into space, a very productive mechanism with a material coolant is needed. In the dense part of the gas envelope of the planets (up to and including the stratosphere), heat transfer is almost entirely convective. The Earth's troposphere (this is below 12-17 km) contains 90% of the mass of air and 99% of atmospheric moisture. The heat flow "surface-space" there is due to the mechanical movement of air masses. This is an extremely rough model of the process. Now, its important detail.

The balance of radiative energy inflow and convective heat outflow requires a rapid vertical movement of the coolant. There is a sharp drop in temperature and pressure along the height. The thermal pressure between the surface of the planet and the upper boundary of the troposphere (altitude 12-17 km) is quite large (on Earth in the equator region from +45 degrees C at sea level to -70 degrees C in the tropopause). But, by itself, convective heat transfer still cannot cope with the load. Energy stupidly "gets stuck" in the lower layers of the atmosphere. Air is an extremely poor heat transfer medium. As a result, the main burden of energy transfer through dense layers of surface air usually lies with the much more productive effect of phase transitions, which acts in parallel with convection. The atmosphere is clearly stratified in height into layers that differ in composition, density and temperature. Moving from heat to cold and back, some of the components of air flows cyclically change their state of aggregation (evaporate, absorbing heat, and condense, giving it away). At the moment of condensation, in the upper layers of the atmosphere, each molecule emits a quantum of radiation leaving for the world space. On Earth, the "working body" of the described heat pump during phase transitions is water, on Venus - sulfuric acid, on Jupiter - ammonia.

In different regions of the planet, due to the evaporation of water from the surface and its re-evaporation in the clouds (water aerosol strongly absorbs infrared radiation), up to 10-55% of the integral solar energy flux is transferred from the troposphere to the stratosphere. The average content of water vapor in the Earth's atmosphere does not exceed 0.3-0.4%, but the energy consumption of its evaporation-condensation is huge and the total contribution of evaporation and condensation in the work of the

"atmospheric heat pump" prevails. This ensures more than 95% of the heat exchange between the surface and the stratosphere. The process goes on around the clock. It is most intense in the tropical zone over the oceans, but is noticeable even over the eternal ice during the polar night. In middle latitudes, during the winter, up to 25-30% of the snowfall evaporates.

The work of the described atmospheric mechanism is accompanied by peculiar side effects. A change in the state of aggregation of a substance dramatically changes its dielectric constant. Spontaneous electrification always occurs at the phase boundary. Part of the thermal energy of the air components is converted into electricity... Condensation of water vapor in the cold upper layers of the gas envelope is accompanied by the accumulation of a large number of positively charged particles there. This is how space charges arise, which form a continuous layer in the upper layers of the Earth's atmosphere.

The uppermost layers of the atmosphere are highly ionized by cosmic radiation and represent a region of high conductivity. Result? Noticeable changes in the field strength over any point on the planet's surface are accompanied by a rapid redistribution of charges in the stratosphere and ionosphere. Therefore, the average intensity of the atmospheric field throughout the planet is almost stable.

The electric field of the lowest layers of the atmosphere, however, is very variable. It is associated with the smallest droplets of water and ice crystals suspended in the air. Free charge carriers (ions and electrons) are almost absent in the troposphere. This gives insulating properties to dense layers of air and prevents self-discharge of the aerosol mass. Due to the low mobility of condensate particles, volumetric electric charges (clouds, jets of fog, etc.) are strongly associated with carrier turbulent flows and move with them for a long time (often for weeks) until they evaporate, discharge onto mountain peaks or fall to the surface with precipitation. So "jet" electric currents in the stratosphere and

mirror-like "telluric" currents in the upper layers of the earth's crust. Result?

A positive space charge of about 0.57 million coulombs constantly hangs in the atmosphere. It creates an electric field with the already mentioned average intensity of 130 V/m. The field pulsates in time with the rotation of the planet (its intensity is maximum at 17:00 GMT, when the Pacific Ocean floats on the sunny side). The average potential difference between the surface and the stratosphere is about 400 kV. This is in any good physics textbook.

The total energy resource of the charged atmosphere (~ 40% of the integral power of solar radiation in the earth's orbit) is estimated at about 2.5-5 per ten to the seventh power of gigawatts. It covers the Earth from pole to pole and is like a global DC distribution network connected to an eternal, free and environmentally friendly source of energy - the Sun.

We return to where we started. There is a stick. On a stick - an insulated wire to the very top. At the end of the wire is an air ionizer. Yes, it doesn't matter what ... It doesn't matter at all ... A corona discharge, a heated wire, an open flame, a piece of a radioactive isotope ... The main thing is that around this elevated conductor, let's call it a "receiver", an excess of ions. Free charge carriers. Yeah, I see it's starting to get...

Air is a moving substance. If the charge left the conductor and escaped into the atmosphere, then its fate is indifferent to us. The electric field, of course, will drag him to the right address. And since there is a flow of charges, then an electric current flows in the circuit. Well, yes, through the air ... The strength of this current depends only on the performance of the ionizer. How many charge carriers he throws out of the metal every second, so many pendants of electricity will flow through this conductor. What is air resistance? And it doesn't exist, practically. can be considered equal to zero. It doesn't matter how we connected directly to the stratosphere, all 400 kilovolts of celestial voltage hanging over our heads seem to be sitting at the end of a lightning rod...

Unclear? Oh, guys and girls, what are you all ... Okay, I'll explain about air resistance. On the contrary... Do you know what grounding is? Well, yes, an iron pin driven into the ground to drain current from the protected equipment. If anything gets there, everything will "close" to the ground and disappear safely in the ground. Now a question for backfilling. What is the earth resistance value? Well, yes, if we take a couple of identical grounds, measure the resistance between them and divide them in two, we will just get the desired value. So, how much? But no! A good ground should have resistance in the order of an ohm. Yes, sir. In any soil, even in dry sand or rock. And don't care about the resistance of the material. In-in ... The main thing is to ensure good contact with the volume, albeit of poorly conductive material. The earth is big. Consequently, the earth's resistance tends to zero, and all resistance losses - only at the point of contact with the earth. Where the charge carriers move densely enough. And all problems are solved. The cross-sectional area of the worst "conductor", when the current spreads in the volume, with the distance from the ground electrode, increases as the square of the distance. Exponentially... Very fast. And just as quickly, its electrical resistance drops. Out of habit - it seems like a paradox ... And just as quickly, its electrical resistance drops. Out of habit

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When an ionizer operates at the upper end of our "atmospheric generator", its resistance, relative to the atmosphere, also tends to zero. More precisely, it is negligible. Volumetric effect, as in the case of grounding in the ground. The strength of the current in the circuit depends only on the performance of the ionizer .. Convenient ...

No, we will not pile the burner on the upper end of the pantograph. And firecrackers - we will not. And we don't have a piece of a radioactive element. It's for the best, by the way... During discharge, in a gaseous environment, the electrodes lose weight. For every ampere-hour of charge flowing through the gas, about a cubic centimeter of electrode material is sprayed by the plasma. Its composition does not matter. There are no materials resistant to plasma chemistry ... At least put tungsten, even silicon, even graphite. Everything burns and oxidizes. Guessed? If you put a radioactive source on top, then atmospheric corrosion will quickly corrode it to holes and all the muck will be sprayed into the environment, settling around in a thin uniform layer. Do we need it? Live easier.

The expendable knob for the receiver of atmospheric current, on all lightning rods, put a simple, environmentally friendly iron. From it, except for rust, no harm. We, too, will not break away from the team ... How to make a banal piece of iron emit plasma ions into the air? There is such a way!

We consider the area of the soil, which is shielded from the atmospheric electric field by a pin, for example, twenty meters high. Yeah, this is the same pine tree that we appointed under the receiver stand. Pi multiplied by "er square", right? Here "er" is the radius of the platform and the height of the receiver. The result is 1256 square meters.

Now we find the area of the receiving electrode, under given conditions, sufficient to ignite a corona discharge on it in clear, cloudless weather. It's simple too. The field strength in the corona is about 30 kV/cm or 3 MV/m. The field strength over flat ground is 130 V/m. We consider the proportion ... Approximately 500 square centimeters of bare metal, a ball with a diameter of 12-13 centimeters, at the top, will already be surrounded by a weak cloud of ionized air molecules ... If you take a thinner rod, then the corona discharge around it will be proportionally stronger. Just?

Not just... The speed of movement of free ions in the air, at atmospheric pressure, is measured in centimeters per second. The top of the current collector will be enveloped by a sedentary cloud of lazily drifting ions, and the discharge will stabilize at the threshold of ignition. As it actually happens with any real lightning rod. Something, slowly, always leaks through it into the atmosphere, but this current is almost imperceptible. Its consequences can only be detected indirectly, by the unnatural smoothness of the metal surface. All the irregularities there seem to be polished. Really. The protrusions and burrs are the first to be "eaten up" by a quiet discharge. For a similar reason, grass is so evenly "trimmed" in all high-mountain "alpine meadows". The field of atmospheric electricity in the mountains is strong. On each blade of grass, sticking out a little higher than the rest,

maybe, in bad weather, catch fire "

Conclusion? If you need a strong discharge, then you need a "point". Not simple, motionless, but dangling in the wind, blown by air pressure. Steel foil (ideally) or metallized paper, varnished from moisture. A long strip of such foil is now fluttering in the wind. Melting, melting, melting... Consumable! And the current adjustment is very simple - the position of the support. Tilt lower - the discharge field weakened. Raised higher - intensified. Need for inventions is cunning ...

Since the earth is negatively charged relative to the atmosphere, and the installation case is grounded, the voltage on the central electrode of the cement pipe is positive. Equal to the potential on the "receiver". When the process stops, this high-voltage part is closed to the housing with a grounded steel pin. Several tens of kilovolts are still present there. The simplest example of using an atmospheric generator "directly" as a ready-made power source for an "electrostatic precipitator". No matching devices for you, no converters. On one side of the chain, a corona discharge burns around an "electricity receiver" splashing in the wind, on the other, a corona discharge burns in a pipe through which dusty gas rushes from the reactor. From the central electrode (barbed wire) the ion flow pushes its way to the surrounding grounded walls. On the way, it charges cement particles and they drift there, after the discharge they settle on the metal. The pipe trembles as the cement slides down the spiral path into the hopper. And nothing else is needed. The "corona" sweeps the entire condensed fraction out of the gas like an invisible broom. It's very simple and clean, yeah... Adjustment of voltage and current - by tilting (lifting height) of the "receiver" bar. How much exactly the voltage in the circuit - no one knows. There were no people willing to measure. And why? You can see from the exhaust port of the pipe ... If the outgoing gas is clean of dust, everything works fine. As soon as the clubs appeared - lift the rack higher. The discharge does not cope ... And sparks of breakdowns began to click loudly in the iron pipe - lower it lower. On the way, it charges cement particles and they drift there, after the discharge they settle on the metal. The pipe trembles as the cement slides down the spiral path into the hopper. And nothing else is needed. The "corona" sweeps the entire condensed fraction out of the gas like an invisible broom. It's very simple and clean, yeah... Adjustment of voltage and current - by tilting (lifting height) of the "receiver" bar. How much exactly the voltage in the circuit - no one knows. There were no people willing to measure. And why? You can see from the exhaust port of the pipe ... If the outgoing gas is clean of dust, everything works fine. As soon as the clubs appeared - lift the rack higher. The discharge does not cope ... And sparks of breakdowns began to click loudly in the iron pipe - lower it lower. On the way, it charges cement particles and they drift there, after the discharge they settle on the metal. The pipe trembles as the cement slides down the spiral path into the hopper. And nothing else is needed. The "corona" sweeps the entire condensed fraction out of the gas like an invisible broom. It's very simple and clean, yeah... Adjustment of voltage and current - by tilting (lifting height) of the "receiver" bar. How much exactly the voltage in the circuit - no one knows. There were no people willing to measure. And why? You can see from the exhaust port of the pipe ... If the outgoing gas is clean of dust, everything works fine. As soon as the clubs appeared - lift the rack higher. The discharge does not cope ... And sparks of breakdowns began to click loudly in the iron pipe - lower it lower. the cement slides along a spiral path into the accumulator. And nothing else is needed. The "corona"

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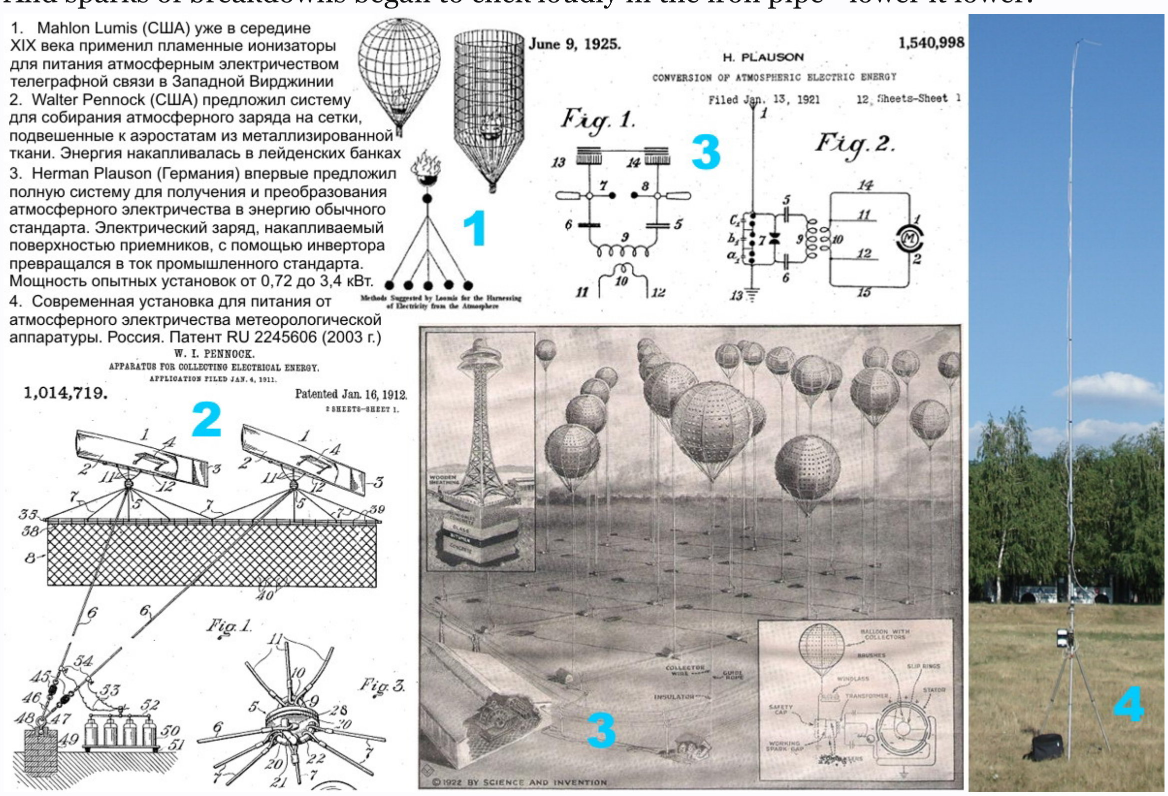


NNN , 5 January 2013 #one

Klon likes this.

Contact
Patsak

I came up with another idea for generating electricity from ionized air.
Man has long been able to receive electricity directly from the air. When we breathe, we do it. If we run fast, we consume more energy, and therefore we breathe more intensively.
How to collect ions in the air and get electricity?
It is possible to drive a stream of air through a strong magnetic field. Positive and negative ions will scatter in different directions, separated by a magnetic field. They should fall on the plates to which the current collector will be connected. For example, a capacitor. Only I need a person on the forum who will help to calculate this installation.
To know at what speed it is necessary to drive air through the pipe through a magnetic field, what strength the magnetic field should be, the area of the plates on which the ions fall. How much energy is contained in a cubic meter of ionized air?

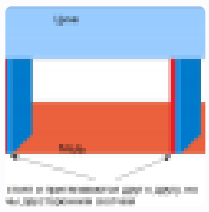
-- Apr 20, 2013, 23:32 --

I tried to conduct the experiment I mentioned above - the effect is zero. Those. using a magnet, it was not possible to separate air ions.
I bought two plate magnets, fixed them with adhesive tape between two metal plates. I tried two plates of copper, aluminum and experience when one plate is made of copper and the second of zinc (as in galvanic cells). I connected a multimeter in voltmeter mode to the plates. He showed a potential difference of zero point, horseradish hundredths of milliamps. I tried to blow on the plates so that air passes between them and blow on them also with the help of a fan - the effect is the same. It turns out that ions in a magnetic field will simply rotate in a circle, as in this model . To force the ions to be attracted to metal plates, you need to apply an electric field of several kilovolts to them, but then no perpetuity will naturally work, because. we will spend more energy than we get.

The only thing that successfully came to my mind about the implemented projects of "vechnyaks" was to use horsepower. After all, horses also breathe air, eat free grass and water.

Who has any ideas how to make ions from the air separate into positive and negative, so that positive ones fly to one plate, and negative ones to another, so that a potential difference is created between the plates?

Attachments:



shema-opita.png
File size: 16.7 KB
Views: 439

Kontakter , March 31, 2013 #2

Good afternoon.
I decided to conduct some experiments for myself regarding atmospheric electricity.
First experiment:
- galvanized sheet s=0.3mm, 2 sq.m.
- height 25m,

Max Rud
Anti-Tenturian

- grounding - galvanized sheet 0.3mm, 0.5 sq.m.
- between them a wire through a voltmeter.
Result: 0.5V maximum.
Thinking that a brick building with iron elements distorts the electric field, we decided to inflate the balloon and go out into the open field.

Here is a video of experiment #2.
[media]https://www.youtube.com/watch?v=iFk3zOwr1wQ[/media]
nothing works yet....
Now we think that we need to introduce a capacitor into the circuit. Perhaps there is an equalization of potentials, which we cannot even notice.

While like this

Max Rud , 3 April 2014 #3

moderator
Administrator
Forum Team

Thanks for the material.
Shot perfectly, the work is done, but there are a couple of errors.
1. The resistance of a household voltmeter is very low, and the current obtained in this way is small, which is why you did not manage to measure the voltage!

Well, here's an example for you, charge a capacitor with a small capacity (up to ten microfarads) and measure its voltage with your voltmeter. You will see that the capacitor itself practically does not discharge, but as soon as you touch it with a voltmeter, the voltage across it immediately drops ...

Therefore, you also need to put a capacitor in the circuit and measure the voltage on it, but not constantly, but only occasionally touching with a voltmeter.

2. Take a steel broom instead of a frame and aluminum. that is, a bunch of wires sticking out like a panicle on one side and soldered or wrapped with wire on the other. So the efficiency will be many times higher.

moderator , 4 April 2014 #four

Rostislav
Administrator

> Max Rud said:
>
> *Thinking that a brick building with iron elements distorts the electric field, we decided to inflate the balloon and go out into the open field.*

What was used as a rope for the ball? The wire? In isolation?

Rostislav , 4 April 2014 #5

Thank you very much for your comment and attention.
I think now an active lightning rod should be used as an antenna.

Max Rud
Anti-Tenturian

It ionizes the air around it.
We will reach the voltage, but then there will be a question with the current strength ...
But we have assembled the circuit. But not tested due to extremely low voltage.
Let's move on.

> Rostislav said:
>
> *What was used as a rope for the ball? The wire? In isolation?*

As a cable, there was a stranded wire 2mm.kv.

Max Rud , 4 April 2014 #6

loginza22096
Anti-Tenturian

The topic is interesting. I will share my observations.
During a thunderstorm, I observed several times how a discharge of a couple of centimeters jumps between a disconnected antenna cable and a nail in the floor. This was before the army. We had strong dry thunderstorms then in Altai. There is lightning, but no precipitation.
Somehow, after the repair, I took the plasma home for testing. Installed and hooked up all right. In the evening it began to rain and a thunderstorm approached. I decided to be safe, the device is a client, you need to pull out the antenna. When trying to pull out the antenna, I received a millimeter discharge between the antenna and the antenna connector. (Plasma turned out to be alive) I bring my finger to the antenna cable and get a discharge. Reddish in color, about a millimeter long. Played for about five minutes.
Later I decided to conduct an experiment to connect a voltmeter between the antenna and ground and take measurements. Waited until the storm approached again. All day before the thunderstorm it was roasting for 30. I went to the service. Time of measurements is 22-23 hours. I quickly bungled an antenna of 11 m of an antenna cord with a section of 3 mm, a decrease of 5 m of a 75 ohm cable (the cable braid was not connected either from above or from the bottom), grounding was 1 ohm. The height of the suspension top point is 6 meters (attached to the ridge of the building), the bottom point is 1.5 meters. In general, an impromptu inclined beam turned out.
The device used a switch, if memory serves ts4341. The selected mode is DC measurement, the measurement limit is 2.5 volts. Installed the device. I turned the head of the device to the exact "0". I'm sitting waiting. Readings "0" Thunderstorm is approaching readings "0", even the arrow does not twitch at the time of the lightning strike. As soon as it started to rain, the device came to life. The readings are very small, so I connected the dt890 in parallel. The measurement limit is 2 volts. The voltage between the antenna and ground is constant 0.02 volts. I didn't measure the current. The alternating voltage is not fixed by the devices. (Maybe not, or maybe the devices are not like that). The switch circuit during lightning discharges reacted but not more than 0.3 volts. Perhaps the inertia of the device is superimposed. The digital camera did not record flashes at all. The storm front proceeded from the place of measurements in 8-10 km. I counted the time after the lightning flash and multiplied by 300. Later this experiment was carried out in the daytime at about 14-15 hours. The storm passed in 3-5 km. The voltmeter reading is about twice as high. I did not write down the exact data (a working